

Refrigerator Fire Caused by Design Flaw and Thawing Turkey

(Frigidaire Refrigerator Model Number: FFHS2313LS)

(I do not know if other models have this design flaw, but this model should be recalled.)



Fire under the compressor start switch/connector shown here after I plugged the refrigerator back in to identify where the problem was

On November 21, 2012 at 4:15 AM my Frigidaire refrigerator caught fire. Fortunately I happened to be up early and walking through the kitchen when the refrigerator cycled on and started to make an electrical sparking sound. I walked toward the refrigerator and looked behind it where I could see the flickering of the flames and could smell the odor from the fire. I immediately pulled the refrigerator out reached in behind and pulled the power cord out. The sparking sound stop immediately, the flame died down, but the smoke continued for a while.



Smoke continued after the refrigerator was unplugged. I do not know how toxic the smoke was. Also notice the penetration above the switch/connector with the two tubes running through it. This is part of the serious design flaw.

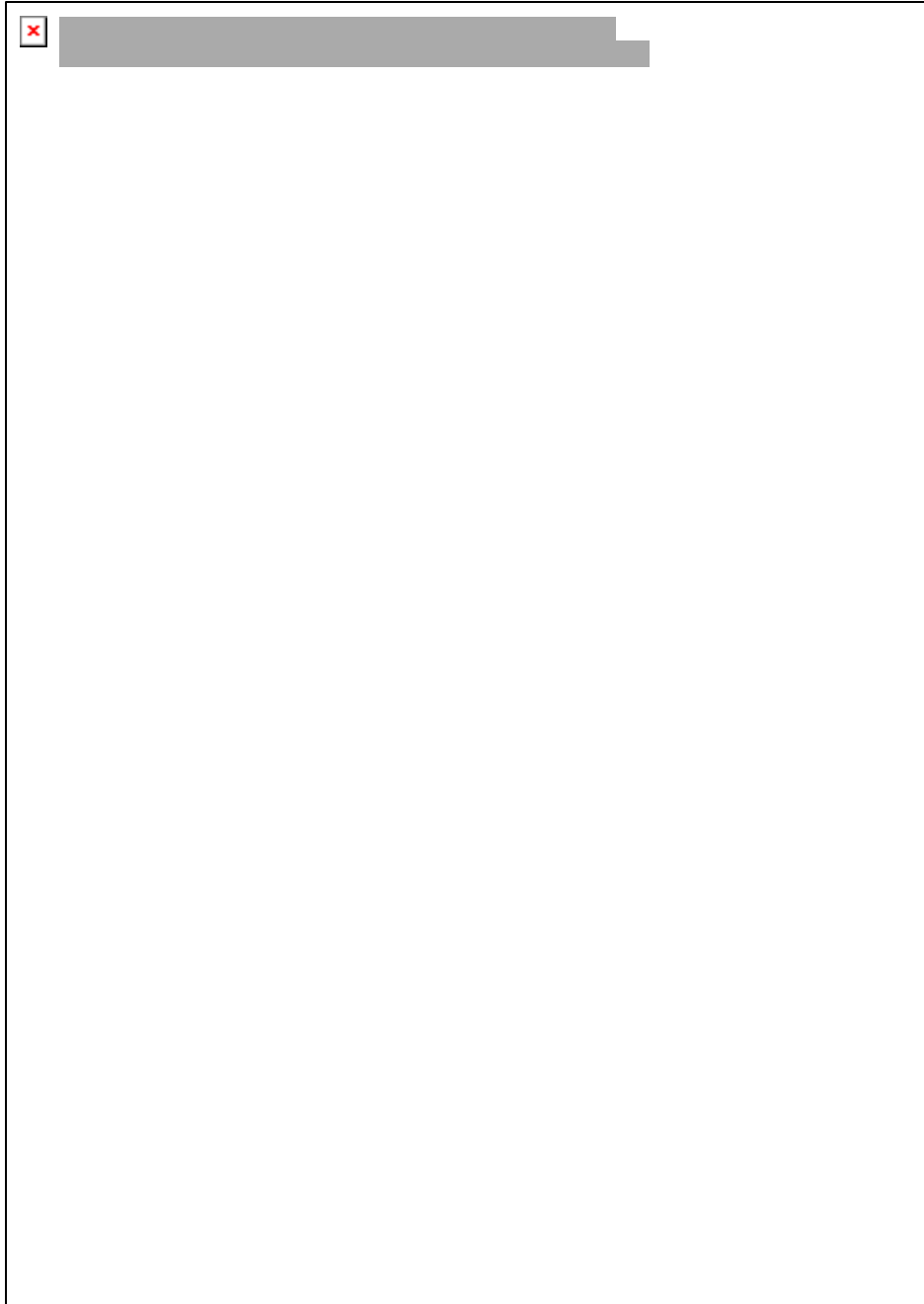
This was the day before Thanksgiving and the refrigerator was filled with the Thanksgiving dinner supplies, including a 20 lb [REDACTED] turkey which was thawing on the bottom shelf just above the "Fresh Drawer".



Since I had no backup refrigerator and it being the day before Thanksgiving and unlikely I would be able to have a replacement refrigerator installed before the Thanksgiving foods were spoiled I decided to determine if there might be a possible fix to the problem. I should also say that I have an electric engineering degree, 30 years of experience working for an electric utility including a position as superintendent of maintenance for a power plant, and also have a couple of years working on Nuclear attack submarine power systems. This gave me some confidence in being able to assess the problem.

I removed the lower back panel from the refrigerator so I could see the area where the flames and smoke was coming from. I got my camcorder so I could document the problem. I decided the best way to identify where the problem is, was to plug the refrigerator back in and let it cycle on while being ready to unplug the refrigerator immediately before any potential flames could spread anywhere. I turned my camcorder on and plugged the refrigerator in and as soon as the refrigerant compressor cycled on the arcing and flames started coming from under the compressor starter switch/connector. I unplugged the refrigerator and the flames died out as smoke took over and then died out.

I could see that the starter/connector had a fluid which had dripped onto its top surface. It appeared the dripping was coming from a penetration just above the starter/connector which had a couple of plastic tubes running through it into the refrigerator interior.



View showing how the penetration into the refrigerator internal area allowed fluids from the turkey to drip onto the switch/connector directly below it.



Pooling of turkey juices around edge of shelf



Turkey removed and glass top surface wiped to see where turkey juices accumulated under the glass shelf



Shelf removed to see where the meat juices were dripping



This view shows how the juices were dripping onto the tube coil and collecting around the penetration hole just above the compressor switch/connector.

I removed the starter/connector and examined it closely to find that there were two plug-in connectors on the bottom side which were the connection points for the starter capacitor. There was a burn section between these connectors where the plastic was blackened and carbonized. This condition would fit with a conductive fluid building in this area between these relatively large surface area connectors which would support a short circuit current eventually leading to the fire. This made me interested in what could have been dripping through this opening above the starter/connector.



Jelled fluid concentrated at the bottom of the compressor switch/connector. Being meet juices, this would have concentrated saline and thus conductive to electric current.



Underside of the switch/connector as it was unplugged from the compressor. Notice the partially exposed copper connector in the burn area. There are two of these on the bottom of this switch/connector and the burn area is between them. This fits perfectly to the larger surface area creating current flow through the concentrated fluid which was accumulating in this area.

What I found was that the 20 lb [REDACTED] turkey on the bottom shelf had thawed and its juices were pooling on the shelf and dripping off the edges, including the rear edge, which was over the tube penetrations which carried the dripping down into the compressor compartment and dripping onto the starter/connector. Obviously these raw turkey juices are saline and as they dripped onto the starter connector they would concentrate through some evaporating thus increasing the conductivity until it reached the point where the short circuit current through the conductive path heated the plastic and drippings enough to start the arcing and fire.

We are only very lucky I happened to be walking through the kitchen at the moment when the Frigidaire Refrigerator cycled on at the point where this build up supported the arcing and combustion point. If I had not observed this directly, other combustible materials in the refrigerator, including plastic parts and the rear panel could have caught on fire and then spread to the finished wood kitchen cabinet directly next to the refrigerator.

This Frigidaire Refrigerator and any other with this design should be recalled. The longer refrigerators of this design are allowed to stay out there the higher the probability that another fire will result from the same situation causing serious injury or death.

Update:

Frigidaire's reaction to refrigerator fire report – On November 23rd I called Frigidaire to report the refrigerator fire and ask if there was a recall on this Frigidaire model FFHS2313LS refrigerator.

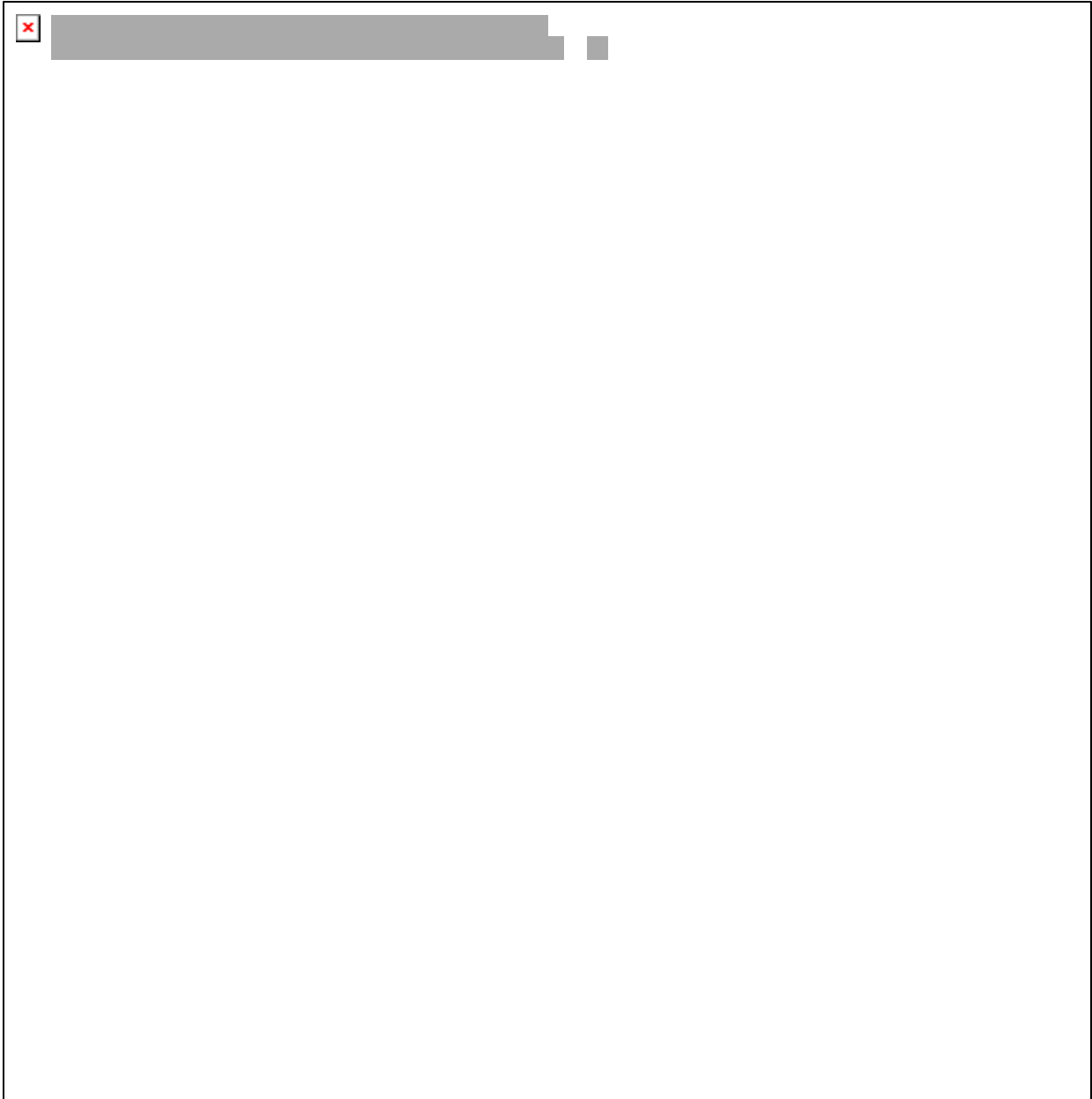
I was told there was no recall on this model refrigerator.

She also told me there was no warranty on my refrigerator and therefore Frigidaire would only cover the cost of parts. No labor costs would be covered. I purchased the refrigerator new 5/29/2011.

Due to the seriousness of this product catching on fire I thought I should be able to get a full refund so I could replace the refrigerator with what I feel is a safe refrigerator. After all, this could have killed us had I not been walking through the kitchen when it caught on fire. She told me a liability claim could not be filed without there being any damage to other property.

Replacement part availability – On November 24th I called the parts supplier identified as the parts supplier in our area for this refrigerator. The parts supplier did not have the parts in stock and told me it would be 7 to 10 days for the parts to come in. The parts were identified as Starter (what I am calling the switch/connector), Capacitor, and Clamp.

Replacement part temporary repair – When the refrigerator fire occurred, I thought the odds were that the parts would be difficult to replace the day before Thanksgiving and therefore, after seeing the problem thought I had a good chance to repair the part temporarily to get by till replacement parts could be obtained. Based on all the evidence I mentioned above, I felt the part failure was due to the short between the terminals and therefore if the shorting material could be cut out there would be no path for the shorting current and thus the components should then operate as designed. Based on this, I removed the shorting material, protected the connector from any potential dripping from above it and reinstalled it. The refrigerator has been operating for one week now with this repaired part. This further validates my conclusion that the problem was due to the leaking meat juice onto the switch/connector.



Here's the switch/connector with the burned conductive path cut out. The remaining components in this assembly remained functional. Since a replacement part was not readily available, I reinstalled this temporary fix and found the refrigerator to work fine. This bolsters my conclusion that the fire was caused from the meat juice concentrating on these connection terminals and creating the short. With the short circuit path removed, there could be no short circuit and no fire. I also placed a baffle above the switch/connector to prevent any potential further dripping from landing on this switch/connector.